# CLAIMS

What is claimed is:

1. A method for measuring a turn-off time of an electronic device, the method comprising:

generating a first bit sequence by reference to a controlling pattern;

transmitting the first bit sequence to the electronic device;

receiving the first bit sequence from the electronic device and a second bit sequence generated by reference to the controlling pattern;

commanding the disablement of the electronic device after initiating said generating step;

comparing bit groups from the first bit sequence from the electronic device to corresponding bit groups in the second bit sequence, said comparing step beginning when said commanding step is executed;

maintaining a count that is incremented each time said comparing step is executed;

storing each bit group from the first bit sequence from the electronic device that does not match a corresponding bit group in the second bit sequence along with a corresponding value of the count;

terminating said comparing step when a bit group from the first bit sequence from the electronic device indicates that the electronic device is turned off; and

computing the turn-off time by reference to the at least one stored bit group and corresponding value of the count.

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2. The method of claim 1, wherein the first and second bit sequences are deterministic bit sequences.

3. The method of claim 2, wherein the deterministic sequences are pseudorandom bit sequences.

4. The method of claim 1, further comprising:

prior to completing the commanding step, using the first bit sequence as a seed for the generation of the second bit sequence;

terminating the use of the first bit sequence as a seed; and

feeding back bit groups of the second sequence to generate the second sequence.

5. The method of claim 1, further comprising synchronizing the first bit sequence with a clock.

6. The method of claim 5, wherein the first bit sequence is synchronized using a programmable delay.

7. The method of claim 1, wherein the electronic device is an electronic transceiver that transmits bits serially through an optical fiber.

8. The method of claim 7 wherein the turn-off time is calculated according to the equation: ((((value of the count - 1) * (a number of bits in the bit group)) + (a bit

position of a last bit – 1)) / (a bit rate of the bits transmitted serially)) - (an optical fiber delay).

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9. A method for measuring a turn-on time of an electronic device, the method comprising:

generating a first bit sequence by reference to a controlling pattern;

transmitting the first bit sequence to the electronic device;

receiving the first bit sequence from the electronic device and a second bit sequence generated by reference to the controlling pattern;

commanding the enablement of the electronic device after initiating said generating step;

comparing groups of output values of the electronic device to corresponding bit groups in the second bit sequence, said comparing step beginning when said commanding step is executed;

maintaining a count that is incremented each time said comparing step is executed;

storing comparison results for each group of output values with an output value that matches a corresponding bit in a bit group in the second bit sequence along with a corresponding value of the count;

terminating said comparing step when an entire group of output values matches a corresponding bit group in the second bit sequence; and

computing the turn-on time by reference to one or more of the stored comparison results and corresponding counts.

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10. The method of claim 9, wherein the first and second bit sequences are deterministic bit sequences.

11. The method of claim 10, wherein the deterministic sequences are pseudorandom bit sequences.

12. The method of claim 9, further comprising:

prior to completing the commanding step, using the first bit sequence as a seed for the generation of the second bit sequence;

terminating the use of the first bit sequence as a seed; and

feeding back bit groups of the second sequence to generate the second bit sequence.

13. The method of claim 9, further comprising synchronizing the first bit sequence with a clock.

14. The method of claim 13, wherein the first bit sequence is synchronized using a programmable delay.

15. The method of claim 9, wherein the electronic device is an electronic transceiver that transmits bits serially through an optical fiber.

16. The method of claim 15 wherein the turn-on time is calculated according to the equation: ((((value of the count - 1) * (a number of bits in the bit group)) + (a bit position of a last bit - 1)) / (a bit rate of the bits transmitted serially)) - (an optical fiber delay).

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17. A method for measuring a turn-off time of an optoelectronic device, the method comprising:

generating a first deterministic bit sequence by reference to a controlling pattern;

transmitting the first bit sequence to the optoelectronic device;

receiving the first bit sequence from the optoelectronic device and a second deterministic bit sequence generated by reference to the controlling pattern;

synchronizing the receiving of the first bit sequence with a clock;

seeding the generation of the second bit sequence, the seeding steps comprising:

using the first bit sequence as a seed for the generation of the second bit sequence;

terminating the use of the first bit sequence as a seed; and

feeding back bit groups of the second sequence to generate the second sequence;

commanding the disablement of the optoelectronic device after initiating said generating step;

comparing bit groups from the first bit sequence from the optoelectronic device to corresponding bit groups in the second bit sequence, said comparing step beginning when said commanding step is executed;

maintaining a count that is incremented each time said comparing step is executed;

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storing each bit group from the first bit sequence from the optoelectronic device that does not match a corresponding bit group in the second bit sequence along with a corresponding value of the count;

terminating said comparing step when a bit group from the first bit sequence from the optoelectronic device indicates that the optoelectronic device is turned off; and

computing the turn-off time by reference to the at least one stored bit group and corresponding value of the count.

18. The method of claim 17, wherein the deterministic sequences are pseudorandom bit sequences.

19. The method of claim 17, wherein the first bit sequence is synchronized using a programmable delay.

20. The method of claim 17 wherein the turn-off time is calculated according to the equation: ((((value of the count - 1) * (a number of bits in the bit group)) + (a bit position of a last bit – 1)) / (a bit rate of the bits transmitted serially)) - (an optical fiber delay).

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21. A method for measuring a turn-on time of an optoelectronic device, the method comprising:

generating a first deterministic bit sequence by reference to a controlling pattern;

transmitting the first bit sequence to the optoelectronic device;

receiving the first bit sequence from the optoelectronic device and a second deterministic bit sequence generated by reference to the controlling pattern;

synchronizing the receiving of the first bit sequence with a clock;

seeding the generation of the second bit sequence, the seeding steps comprising:

using the first bit sequence as a seed for the generation of the second bit sequence;

terminating the use of the first bit sequence as a seed; and

feeding back bit groups of the second sequence to generate the second sequence;

commanding the disablement of the optoelectronic device after initiating said generating step;

comparing bit groups from the first bit sequence from the optoelectronic device to corresponding bit groups in the second bit sequence, said comparing step beginning when said commanding step is executed;

maintaining a count that is incremented each time said comparing step is executed;

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storing each bit group from the first bit sequence from the optoelectronic device that does not match a corresponding bit group in the second bit sequence along with a corresponding value of the count;

terminating said comparing step when a bit group from the first bit sequence from the optoelectronic device indicates that the optoelectronic device is turned on; and

computing the turn-on time by reference to the at least one stored bit group and corresponding value of the count.

22. The method of claim 21, wherein the deterministic sequences are pseudorandom bit sequences.

23. The method of claim 21, wherein the first bit sequence is synchronized using a programmable delay.

24. The method of claim 21 wherein the turn-on time is calculated according to the equation: ((((value of the count - 1) * (a number of bits in the bit group)) + (a bit position of a last bit – 1)) / (a bit rate of the bits transmitted serially)) - (an optical fiber delay).

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25. A system for measuring a turn-off time of an electronic device, the system comprising:

a first sequence generator configured to generate a first bit sequence;

a controller;

the electronic device configured and arranged for communication with the first sequence generator and the controller, the electronic device being capable of receiving and transmitting the first bit sequence;

a second sequence generator configured to generate a second bit sequence, the first bit sequence having bit groups that correspond with bit groups in the second sequence;

the controller further configured and arranged to receive and compare the corresponding bit groups in the bit sequences,

wherein after the electronic device is disabled, the controller continues receiving and comparing corresponding bit groups in the sequences of bits until the bit group comparison indicates that the electronic device is off;

a counter capable of providing a count corresponding to the receipt of bit groups at the controller, the counter incrementing over a period defined by the disablement of the electronic device and the indication by the comparison of the corresponding bit groups that the electronic device is off;

a memory configured to store at least one bit group and a corresponding value of the count; and

the controller further configured to determine the turn-off time by reference to the at least one bit group and corresponding value of the count.

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26. The system of claim 25, wherein the first sequence generator and the second sequence generator generate deterministic bit sequences, such that the first and second generators produce the same bit group from like input.

27. The system of claim 26, wherein the deterministic bit sequences generated by first and second generators are pseudorandom bit sequences.

28. The system of claim 26, wherein the first sequence generator generates a seed value used by the second generator to generate bit groups having corresponding bit groups in the first sequence, the seed value being a bit group generated prior to the generation of the corresponding bit group in the first sequence.

29. The system of claim 25, further comprising an alignment device configured to synchronize the first sequence with a clock.

30. The system of claim 29, wherein the alignment device is a programmable delay.

31. The system of claim 25, wherein determining the turn-off time includes communicating the at least one bit group and corresponding value of the count to an external device.

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32. The system of claim 31, wherein the external device is a computer.

33. The system of claim 25, wherein the controller implements logic to calculate the turn-off time.

34. The system of claim 25, wherein the electronic device is an optoelectronic transceiver that transmits bits serially through an optical fiber.

35. The system of claim 34, wherein the controller calculates the turn-off time according to the equation: ((((the clock count - 1) * (a number of bits in a bit group)) + (a bit position of a last bit - 1)) / (a bit rate of the bits transmitted serially)) - (an optical fiber delay).

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36. A system for measuring a turn-on time of an electronic device, the system comprising:

a first sequence generator configured to generate a first bit sequence;

a controller;

the electronic device configured and arranged for communication with the first sequence generator and the controller, the electronic device being capable of receiving and transmitting the first bit sequence;

a second sequence generator configured to generate a second bit sequence, the first bit sequence having bit groups that correspond with bit groups in the second sequence;

the controller further configured and arranged to receive and compare the corresponding bit groups in the bit sequences,

wherein after the electronic device is enabled, the controller continues receiving and comparing corresponding bit groups in the sequences of bits until the bit group comparison indicates that the electronic device is on;

a counter capable of providing a count corresponding to the receipt of bit groups at the controller, the counter incrementing over a period defined by the enablement of the electronic device and the indication by the comparison of the corresponding bit groups that the electronic device is on;

a memory configured to store at least one bit group and a corresponding value of the count; and

the controller further configured to determine the turn-on time by reference to the at least one bit group and corresponding value of the count.

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37. The system of claim 36, wherein the first sequence generator and the second sequence generator generate deterministic bit sequences, such that the first and second generators produce the same bit group from like input.

38. The system of claim 37, wherein the deterministic bit sequences generated by first and second generators are pseudorandom bit sequences.

39. The system of claim 37, wherein the first sequence generator generates a seed value used by the second generator to generate bit groups having corresponding bit groups in the first sequence, the seed value being a bit group generated prior to the generation of the corresponding bit group in the first sequence.

40. The system of claim 36, further comprising an alignment device configured to synchronize the first sequence with a clock.

41. The system of claim 40, wherein the alignment device is a programmable delay.

42. The system of claim 36, wherein determining the turn-on time includes communicating the at least one bit group and corresponding value of the count to an external device.

43. The system of claim 42, wherein the external device is a computer.

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44. The system of claim 36, wherein the controller implements logic to calculate the turn-on time.

45. The system of claim 36, wherein the electronic device is an optoelectronic transceiver that transmits bits serially through an optical fiber.

46. The system of claim 45, wherein the controller calculates the turn-on time according to the equation: ((((the clock count - 1) * (a number of bits in a bit group)) + (a bit position of a last bit - 1)) / (a bit rate of the bits transmitted serially)) - (an optical fiber delay).

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47. A system for measuring a turn-off time of an optoelectronic device, the system comprising:

a first sequence generator configured to generate a first deterministic bit sequence by reference to a controlling pattern;

a controller;

the optoelectronic device configured and arranged for communication with the first sequence generator and the controller, the optoelectronic device being capable of receiving and transmitting the first bit sequence serially;

an alignment device configured to synchronize the first sequence with a clock;

a second sequence generator configured to generate a second deterministic bit sequence by reference to the controlling pattern;

the first bit sequence having bit groups that correspond with bit groups in the second sequence;.

the first sequence generator further configured to generate a seed value used by the second generator to generate bit groups having corresponding bit groups in the first sequence, the seed value being a bit group generated prior to the generation of the corresponding bit group in the first sequence;

the controller further configured and arranged to receive and compare the corresponding bit groups in the bit sequences,

wherein after the optoelectronic device is disabled, the controller continues receiving and comparing corresponding bit groups in the sequences of bits until the bit group comparison indicates that the optoelectronic device is off;

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a counter capable of providing a count corresponding to the receipt of bit groups at the controller, the counter incrementing over a period defined by the disablement of the optoelectronic device and the indication by the comparison of the corresponding bit groups that the optoelectronic device is off;

a memory configured to store at least one bit group and a corresponding value of the count; and

the controller further configured to determine the turn-off time of the optoelectronic device by reference to the at least one bit group and corresponding value of the count.

48. The system of claim 47, wherein the deterministic bit sequences generated by first and second generators are pseudorandom bit sequences.

49. The system of claim 47, wherein the alignment device is a programmable delay.

50. The system of claim 47, wherein determining the turn-off time includes communicating the at least one bit group and corresponding value of the count to an external device.

51. The system of claim 47, wherein the controller calculates the turn-off time according to the equation: ((((the clock count - 1) * (a number of bits in a bit group)) + (a bit position of a last bit - 1)) / (a bit rate of the bits transmitted serially)) - (an optical fiber delay).

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52. A system for measuring the turn-on time of an optoelectronic device, the system comprising:

a first sequence generator configured to generate a first deterministic bit sequence by reference to a controlling pattern;

a controller;

the optoelectronic device configured and arranged for communication with the first sequence generator and the controller, the optoelectronic device being capable of receiving and transmitting the first bit sequence serially;

an alignment device configured to synchronize the first sequence with a clock;

a second sequence generator configured to generate a second deterministic bit sequence by reference to the controlling pattern;

the first bit sequence having bit groups that correspond with bit groups in the second sequence;

the first sequence generator further configured to generate a seed value used by the second generator to generate bit groups having corresponding bit groups in the first sequence, the seed value being a bit group generated prior to the generation of the corresponding bit group in the first sequence;

the controller further configured and arranged to receive and compare the corresponding bit groups in the bit sequences,

wherein after the optoelectronic device is disabled, the controller continues receiving and comparing corresponding bit groups in the sequences of bits until the bit group comparison indicates that the optoelectronic device is on;

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a counter capable of providing a count corresponding to the receipt of bit groups at the controller, the counter incrementing over a period defined by the disablement of the optoelectronic device and the indication by the comparison of the corresponding bit groups that the optoelectronic device is on;

a memory configured to store at least one bit group and a corresponding value of the count; and

the controller further configured to determine the turn-on time by reference to the at least one bit group and corresponding value of the count.

53. The system of claim 52, wherein the deterministic bit sequences generated by first and second generators are pseudorandom bit sequences.

54. The system of claim 52, wherein the alignment device is a programmable delay.

55. The system of claim 52, wherein determining the turn-on time includes communicating the at least one bit groups and corresponding value of the count to an external device.

56. The system of claim 52, wherein the controller calculates the turn-on time according to the equation: ((((the clock count - 1) * (a number of bits in a bit group)) + (a bit position of a last bit - 1)) / (a bit rate of the bits transmitted serially)) - (an optical fiber delay).

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